Repair of Restorations [1]

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Context

Defective dental restorations are frequently encountered in general dental practice. Replacement of such restorations is often costly and necessitates sacrifice of sound tooth tissues compromising the vitality of the dental pulp and potentially accelerating of the restoration cycle or premature loss of the tooth.

With the advances in adhesive dentistry, restoration repair has become an integral part of minimally invasive dentistry. The repair of restorations should be considered on a case-by-case basis.

Current surveys investigating the attitudes and experiences of dentists regarding repaired restorations indicate they are gaining increased acceptance among dental practitioners and patients[1]. Nevertheless, repair of restorations is not practiced frequently worldwide partly due to lack of global guidelines[2], limited information on the long term clinical outcomes[3], continuous changes in materials and technologies[4,5] and variations in dental teaching curricula worldwide as well as healthcare systems[2].

Scope

The present FDI Policy Statement gives guidance on the diagnosis of defective restorations made of various direct and indirect materials using well-established quality assessment criteria based on visual, tactile and radiographic examinations and tooth- and patient-specific criteria.

This Policy Statement defines measures for decision making on when and how to repair and when to replace restorations.

Definitions

Repair: Correction of a clinically unacceptable restoration bringing it to a clinically acceptable status with a minimally-invasive approach that implies the addition of a restorative material

Refurbishment: Procedure involving removal of overhangs and irregularities, surface recontouring, removal of discolouration and smoothening or glazing of surface to improve a dental restoration and delay repair

Sealing: *Refurbishment* consisting of closure of superficial pores and small gaps by adding glaze or bonding and, occasionally, a new layer of sealant or flowable material

Principles

Cutting sound tooth tissue always causes irreversible damage and cavity size will invariably increase when restorations are replaced, regardless of material. Repair of restorations preserves the existing tooth structure and tooth vitality, increases the longevity of the remaining restoration, may reduce chairside treatment time, may reduce the need for local anaesthesia and help mitigate the effects of dental anxiety as well as saving overall resources.

Policy

FDI World Dental Federation supports a shift in management of defective restorations necessitating that the

required protocols for repairing defective restorations be included in undergraduate curriculum and continuing education.

The individual risk of the patient to develop carious lesions, the clinical condition and prognosis of the restored tooth as a unit, cost-benefit analysis, medical history and dental anxiety are critical considerations for appropriate decision-making regarding repairs. Finally, repair focuses on tooth survival. The feasibility of repair should always be discounted first and the underlying cause of failure should be identified before repair or total replacement is undertaken.

Refurbishment is often effective successfully to manage superficial staining and overhangs of restorations but deeper penetrations of (marginal) staining or presence of defects may require repair or total replacement to achieve acceptable aesthetic outcomes[6].

Repair protocols are determined by the restoration material in place and specific manufacturer instructions along with the durability of adhesion achieved on the substrate and the location in the oral cavity. An armamentarium of methods and meticulous application of chemicals may be required[4].

1. **Surface preparation:** All types of restoration surfaces to be repaired need to be cleaned first using pumice or polishing paste. Loose/cracked areas on surface should be removed and smoothed by i.e. fine-grit diamond burs.
2. **Physical conditioning:** Resin composite, amalgam, zirconia and exposed metal parts of metal-ceramic reconstructions (PFM) initially require application of physical conditioning method using air-borne particle abrasion (i.e. alumina or silica-coated alumina particles). Glassy matrix veneering ceramics could be etched with buffered hydrofluoric acid to achieve micromechanical retention (respecting precautions and national directives).
3. **Chemical conditioning:** The next step is chemical surface conditioning of the substrates using silane coupling agents for hybrid composite resins and silicate ceramics or i.e. 10-MDP-primers for zirconia. This is followed by adhesive resin application and its photo-polymerization.
   In cases where there are exposed metal surfaces tribochemical silicatization of the surface with silica-coated particles (cojet) followed by silanization (with silane) and adhesive is recommended.
4. Resin composite can then be adhered onto the physico-chemically conditioned surfaces as repair material which is then photo-polymerized.
5. Lastly, the repaired area is finished and polished.
6. If tooth substance is present next to the restoration to be repaired, the restoration surface should first be treated with the appropriate physical conditioning method prior to physical conditioning (etching with phosphoric acid) of the tooth surface. The chemical conditioning of the restoration with silane or 10-MDP/multiple primers and chemical conditioning of the restoration and the tooth surface with an adhesive resin should be the conditioning sequence for multiple substances.

Disclaimer

The information in this Policy Statement was based on the best scientific evidence available at the time. It may be interpreted to reflect prevailing cultural sensitivities and socio-economic constraints.

References

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Science Committee [2] **Classification:** Minimal intervention [3]
Restorative Material [4]

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